

Should overweight youth and adults with osteoarthritis be encouraged to lose weight or not?

Abstract

Obesity, which is on the rise, is a risk factor for, as well as a possible negative outcome mediator of multiple forms of painful disabling osteoarthritis. At the same time, social forces prevail that view this possible association and others that show body weight and its reduction as a disease mediator as a form of bullying rather than focusing on whether the disability can be reduced by accepting a role for excess weight as this affects one or more joints. To examine this issue the PUBMED and GOOGLE SCHOLAR data bases were sourced for relevant data published between January 2020 and mid May 2023 as aspects of this topic largely emerged during the COVID-19 pandemic and thereafter. These data bases show that while most current publications tend to portray a negative impact of obesity on osteoarthritis prevalence and outcomes, others seek to focus more on 'fat acceptance' and body positivity at any size. While research is limited in this regard, it appears salient to provide patients who might be benefitted with information to make an informed decision. Many calls that focus simply on stigma reduction, might fail to appreciate how painful osteoarthritis can be and how it can lead to further weight gain and basic physiological challenges, even if mental health is preserved. Social media need to review what is espoused and whether messages will reduce or increase widespread harm.

Keywords: fat acceptance, obesity, osteoarthritis, overweight, stigma, prevention

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Introduction

Obesity is deemed by many mainstream health providers and policy makers to be a chronic illness that can affect children, adolescents, and young and older adults.¹ Osteoarthritis, the most prevalent chronic health condition affecting older adults is strongly associated with the presence of excess body weight, even if this is not causative. A disease with no known cure, multiple articles published in the last two and a half decades invoke multiple mechanistic reasons why efforts to normalize body weight may impact one or more osteoarthritis affected joints.² Indeed, at the knee, the most commonly affected major weight bearing joint subject to osteoarthritis, both general, as well as central indicators of obesity appear to have a significant impact on joint status.³

On the other hand, an emergent theme of concern is the stigmatization of the obese adult, regardless of underlying cause or possible health risk, as this can impact mental health as well as social wellbeing, especially if the condition is blamed on the 'victim'.⁴ However, can the adoption of more neutral body image approaches on social media that entail and encourage the acceptance perspective where size and excess body fat are deemed socially constructed negative concepts that target vulnerable groups have any bearing on the importance of timely efforts to thoughtfully intervene to prevent or avert the undue suffering caused by obesity associated joint inflammation, excess joint loading and pain provocation that can arise in early life, in addition to advanced age states.^{5,6} While the idea of fat shaming must be subjected to the harshest scrutiny, especially if it leads to eating disorders and mental health consequences, is it not more ethical to follow the idea that body size variations are many and must all be deemed acceptable and made a source of 'pride', but intervened upon if deemed injurious or even life threatening.^{6,7} [https://www.hindustantimes.com/fitness/fat-acceptance-and-fat-pride-movement]. Are-we-glorifying-or trying to normalize obesity-in-the-name-of-body-positivity- regardless, or is it more ethical to prevent and identify if indeed body weight is in

excess due to modifiable causes and if life threatening be mitigated to the degree possible if consent is forthcoming.⁸⁻¹⁰

A parallel question is whether the apparent rise in childhood obesity rates is an artifact or a situation being exploited to advance certain political as well as economic agendas at the expense of certain ethnic groups and not others.

Aims

- i. This mini review duly sought to ascertain if there is any concern about early and mid-life weight gain when considering the crippling disease known as osteoarthritis in vulnerable cases.
- ii. A sub goal was to ascertain if adults with disabling osteoarthritis who suffer from obesity benefit in any way from weight loss recommendations and programs in the context of randomized trials.
- iii. A third aim was to examine what benefits, if any, are evidenced.
- iv. Finally, the answer as to whether the approach advocated for moderating body weight among overweight osteoarthritis sufferers are presently justified or not was sought.

Methods

A concerted effort to examine relevant materials in the peer reviewed literature concerning body weight and health, body weight and osteoarthritis, fat acceptance issues, whether overweight status is injurious or not? Key data sources were PUBMED, GOOGLE SCHOLAR and PubMed Central. Data pertaining to the aims of this commentary and review were sought regardless of year of origin if deemed pertinent by the author. No formal review was possible, and interested readers are urged to pursue one or more of these lines of inquiry in more depth. Excluded were detailed intervention studies, and surgical and drug approaches for offsetting obesity. A strong focus was placed on examining obesity in the context of the condition of

hand osteoarthritis, as this joint is deemed less susceptible to joint loading impacts as a major disease determinant. No drug or surgically oriented articles are pursued, nor are problems such as tooth loss in young children and adults due to sugary drinks and that cause pain, plus cognitive developmental manifestations and academic challenges in young children, non-alcoholic liver disease, asthma, depression and bullying outcomes of failing to address obesity discussed. All forms of publication however that focused on the issues related to the current aims were deemed acceptable.

Results

General findings

Even if one accepts a role for publication bias, a cursory review of the prevailing literature reveals no shortage of peer reviewed articles that generally paint a negative association between the presence of excess body fat relative to stature and overall wellbeing, even if the person deemed overweight feels or is deemed 'healthy'. However, even though Rutherford in 2010 reported that obesity was becoming increasingly common, and it was estimated that at least 400 million persons could be categorized as being obese worldwide at that time when only adults were concerned, no predictions were made about how timely well construed global efforts could help to abate this unprecedented public health concern.¹¹ Instead, it was reported that the World Health Organization projected this statistic could reach 700 million by 2015, although why this would be, was unclear. However, even with this dire set of data as well as many public health efforts to address this concern that have since emerged, this set of predictions has not been accompanied by any meaningful abatement, but by further increasing trends of this health state that has since been framed as a 'disease'.^{11,12} Hence, as of June 2021, unsurprisingly, one updated report by the World Health Organization indicated that epidemic levels of obesity had been reached globally, with at least 2.8 million deaths each year being projected as a result. At the same time, although once associated largely with high-income countries, obesity is now equally prevalent in low- and middle-income countries.¹³ As pointed out by Rutherford¹¹ not only is being overweight a possible risk factor for multiple challenges in life, including health and economic challenges, adiposity remains a condition that is highly stigmatized in many societies and is potentially exacerbated accordingly.¹²

As such, the costs of obesity remain unremitting.⁹ At the same time, although it can be conjectured that adults deemed obese may theoretically have strong social and life quality associated motivations for losing weight, this may not be intuitive or even considered of any value, especially in the face of movements that urge re-thinking of the validity and overwhelming negative positioning or framing obesity as a health problem.⁹ In addition, Lam et al.¹² report persons deemed to be excessively overweight may not perceive their weight to be a significant problem or one linked to health, and consequently do not seek or receive advice about losing weight from their providers even though emergent and abundant evidence shows obesity is commonly linked to a high number of life-threatening co morbidities including cardiovascular disease, type 2 diabetes, and some types of cancer. Adults who are in favor of 'fat acceptance' in general, but do want to take action personally, may feel socially constrained to do so, as they do not want to be shamed by their advocacy colleagues. They may also feel shamed by their providers even if they elect to explore their options, if severely overweight.

As such, unaddressed obesity issues, which may prevail for multiple reasons, have the propensity to severely threaten and diminish life quality, including the ability to move and work, navigate public

places, and provide care for others. It remains an undisputed risk factor for multiple highly disabling musculoskeletal disorders such as osteoarthritis, implicated in 60 percent of cases,¹⁴ high hospital usage, and costs to the individual as well as society, even among the healthy obese¹⁵⁻¹⁷ especially when all this is largely unpublicized in most articles currently contesting the dangers of obesity and ascribing its construction by some to nefarious aims by many 'fat pride' social influencers. These 'influencers' who may want to do good, may however, misunderstand the associated spectrum of related medical safety issues¹⁸ or the vulnerability of their young or older clients in their desire to encourage them to step away from 'white' originating norms where adiposity states may be deemed less socially acceptable than other health associated states of being.¹⁹

Instead, a desire that prevails of late is for changes in philosophy and medical practices, towards advancing fat 'activism'. This 'pushback' to counter a variety of generalized body size beliefs that has emerged socially, while understandable may however fail to consider the need to help the targeted audiences remain mindful of any health disadvantages that can be shown empirically to be more health negating than not.^{20,21} Lofton et al.²² point out however, that 'fat activism' alone may also fail to directly speak to those structural racism factors that account for some cases who exhibit an excess degree of body fat, such as limited access to healthy foods, safe spaces, adequate health insurance, and culturally tailored health care. Conscious and unconscious interpersonal racism may also impact obesity care and outcomes, especially among many African American women that alone may adversely affect interactions between the health care practitioner and the client if unaddressed.

To counter the stigma and perceived victimization of being a fat person, communities, such as the National Association to Advance Fat Acceptance (NAAFA), have unsurprisingly begun to contest society's stubborn generalization that associates fatness with disease and poor health outcomes. This group and others with similar beliefs strongly endeavor to push back against the assumption that fat people have little regard for themselves or their own well-being. They stress the fallacy of thinking about obesity as a disease or medical risk. They argue that the person categorized as being obese was often unfairly depicted during the COVID-19 pandemic, where many persons who were overweight were often affected more severely than those with more normative non obese body indicators, and appeared to pose an excessive drain on already burdened health care system.

As a result, the NAAFA continues to mobilize and fight against weight discrimination and what is termed the 'fat phobia' attribute that is commonly held and upheld by many in multiple spheres, including but not limited to employment, quality health care and educational spheres. Similarly, they highlight how social scientists who use the term "fat" rather than the alternate deeply problematic medical term, "obesity," can cause undue harm. Accordingly, they indicate that these terms and others must be carefully employed and non-judgmentally applied to avoid any ensuing harmful impact and to achieve 'fat justice' without compromising the person's rights and health opportunities. Hence very careful efforts to develop new ways of thinking about how to frame body diversity more suitably for all are strongly needed. In particular, it is believed the terms fat and obese should be uncoupled from pathology, moral weakness perceptions and failed citizenship attributes that can fuel stigma in various settings, including health settings. Moreover, a person deemed to be 'fat' and at risk of a particular health condition should not be categorized in a manner that implies they are or may become unhealthy, because this may do little to promote their wellbeing.²³

On the other hand ‘fat’ acceptance as a stance along with negation of medical profiling approaches that use the measure of body mass index⁵ is a notion to be interrogated rather than accepted.⁹ In the absence of unbiased objective evidence, adopting an all or nothing stance of fat acceptance at any size for any person cannot bode well for all adults, and especially not for children who are at potentially high risk for obesity, and highly negative obesity impacts that are not genetic in origin. In addition to social inequities, their exposure to social media influencers glorifying, normalizing, or espousing the upside attribute of a state of body ‘fatness’, but not the downside may do more harm than good. Omitting positive health actions from TV programs that are found questionable for children may fail to address possible modifiable weight issues and how exercise can help. [https://www.reddit.com/r/bluey/comments/12q2xpq/was_this_episode_really_fatshaming_or_are_people/].

It is possible too that the focus on averting stigma due to actual or perceived fat shaming is overshadowed by other apparent interests that favor support for the ‘fat rights’ groups ideas and rhetoric without any qualms, for example those who seek to market and profit from new ‘large size’ clothes and addictive fat inducing food products, songs, videos, and slanted publications, or are bent on using the ‘fat’ stigma idea for political or financial purposes knowing full well that multiple verifiable and observable negative obesity impacts do prevail and are often due to modifiable factors. These include soft drink availability, fast food availability and low costs, and their link to low income communities and food deserts. As well, multiple compelling controversial or divisive media platforms by those who want to market unhealthy products, evoke social justice issues, gain a following on social media may slant the facts about who is at risk for poor health and limited prosperity, by negating the evidence base and recommended mainstream lifestyle changes. Moreover, a push to use and develop drugs to ameliorate obesity as well as those who are willing to operate surgically on persons who are obese at all ages, rather than fostering prevention efforts may have motives other than human wellbeing.

At the same time, the linkage of excess body fat to the risk of joint damage that may produce incurable osteoarthritis, the most widespread disabling chronic health condition in later life, is indeed a verifiable fact in its own right that is reproducible, not spurious, or related to political agendas. This information has prevailed for almost three decades or more in the osteoarthritis literature, along with efforts to avert this dual condition with limited success, especially among the most severely obese adult population. Multiple lab model studies alone show rodents and other small mammals fed with excess fat or foods sufficient to induce obese states commonly induce subsequent joint lesions and dysfunction not associated with age.² Attributed to associated loading influences on one or more joints, as well as health and the subsequent presence of chronic bouts of pain, plus inflammatory mechanisms, obesity can invoke more severe and extensive osteoarthritis damage than control subjects of normal weight all factors being equal. As well, even if not a disease precursor, obesity may be reactive in nature due to the disease itself, and harmful to efforts to lead a high life quality.

Additional observations

Recent studies confirm there is considerable interplay between a variety of immune cells and other cells that reside in freely moving joints that may constitute a vicious cycle that leads to osteoarthritis joint destruction to an increased degree in the obese individual.²⁴ Consequently the long held view that weight loss or weight optimization is a very salient osteoarthritis disease modification approach appears to have quite strong objective support.² By contrast,

a failure to address the role of obesity in this respect, which may impact metabolic factors to a high degree, rather than only joint loading, as seen in hand osteoarthritis, may produce pro inflammatory degenerative degrading chemicals in the muscles and tissues around a vulnerable joint.²⁵ The obesity osteoarthritis linkage may also be related to diabetes and hypertension correlates rather than metabolic factors^{26–28} and although disputed by Go et al.²⁹ cannot be ignored readily.

Obesity also leads to a condition termed sarcopenic obesity where muscle mass is replaced by fat mass. Hence, simply hoping acceptance of a fat body and efforts to ignore medical knowledge will be more helpful than efforts to advocate for maintaining a healthy body weight and disputing prescriptions to this end must be questioned.³⁰ Also, an acceptance of altering the surgical standards guided by weight, to offer joint replacement surgery in later years by ignoring the presence of excess weight or believing this can have no ill effects, seems misleading given the importance of muscle in joint movement and protection and infection after surgery as well as surgical complications. The idea that an excess body mass index should not preclude surgical joint replacement and has the same value as that in a person with a healthy weight, may also discourage any effort to address body weight excess through active health affirming behaviors regardless of any other health risks³¹ and may well encourage acceptance of body size regardless.

A population based study by Reyes et al.³² has shown a status of overweight, grade I obesity, and grade II obesity to increase the risk of knee osteoarthritis by a factor of 2, 3.1, and 4.7-fold, respectively, thus whether obesity is a risk or parallel disabling factor in this regard is hard to refute. As a result, obesity-induced osteoarthritis is now included in a larger phenotype termed “metabolic osteoarthritis” that is associated with various metabolic syndrome indicators such as type-2 diabetes and excess cardiovascular disease. Conversely, because early-onset osteoarthritis may implicate the potential for acquiring metabolic syndrome, weight loss strategies are indicated accordingly to prevent disability and to allow for optimal outcomes.³³

An analysis of 21 studies by Jiang et al.³⁴ showed body mass index was positively associated with hand osteoarthritis in cross-sectional studies. In addition their data pointed to the marked impact of only a single affected joint on the person’s wellbeing both physical as well as social when some of the hand dysfunction was apparently exacerbated by the presence of excess body fat. Visser et al.³⁵ report that in cases with hand osteoarthritis that are more common in women than men measures of fat percentage tend to be associated with the disease, regardless of gender. Moreover, the measure of visceral fat showed this was a possible factor in the presentation of hand osteoarthritis manifestations in men.

As reported by Carmen et al.³⁶ in a 23 year long follow up study, greater baseline weight status was more strongly associated with the subsequent development of hand osteoarthritis, the association of osteoarthritis at these joints and obesity appeared causative rather than reactive. That is, the presence of osteoarthritis did not appear to have any impact on the weight status of the cohort examined. As per Cruz et al.³⁷ having hand osteoarthritis, along with features of obesity and a diabetes diagnosis do appear to be independently associated with worse hand functional status than not. This may be because among people with hand osteoarthritis, a higher body mass index is associated with greater pain severity in the hands, feet, and knees/hips. Moreover, the systemic effects of obesity, measured by Leptin may play a larger mediating role for pain in the hands than in the lower extremities. Hence even a single affected joint can be very impairing in the overweight patient. Low-grade inflammatory

responses may also contribute to generalized pain in overweight/obese individuals.³⁸ This inflammatory response may increase in the presence of worsening joint alignment, as well as joint damage and altered joint loading in the presence of obesity.³⁹

Zhao et al.⁴⁰ show the rate of osteoarthritis to be associated with a high body mass index as observed by a continuous upward trend of both conditions in most countries. As such they argued that women and older people who are more sensitive to osteoarthritis should receive appropriate counseling if they appear at risk. In addition, according to Lam et al.¹² obesity is strongly related to >50 medical conditions, with many of them having evidence from Mendelian randomization studies to support causality. The clinical, social and economic burdens of obesity are hence considerable and potentially impact future generations. Hence, while openness to different interpretations of obesity need to prevail,¹⁰ the dangers of the presence of obesity as far as joint status goes⁴¹ should arguably be duly acknowledged rather than overlooked from the earliest point in time to mitigate predictive adverse immeasurable costly health and economic consequences.⁴²

In sum, while how obesity is measured may dictate what is observed, and some of the high body mass health associations may be spurious, the fact is that many children today who are obese also have one or more metabolic diseases previously only seen in older age persons.⁴³ Their life is jeopardized severely in multiple ways and even those who value the body at any size must be cautioned to avoid blanket glorification of fatness in our view. As one of many risk factors, and even though a fair percentage of cases with end stage osteoarthritis may be of normal weight for their height or underweight, many are overweight and at high risk for more severe disability than not and that can be shown to have a distinctive cellular and molecular basis.⁴⁴ While these mechanisms are not completely understood, controlling weight to ensure a healthy body mass is consistently advocated internationally both for osteoarthritis and general wellbeing appears to have strong tentative support.⁴⁵

However, given that a recent meta-analysis demonstrated only modest effects of weight loss on osteoarthritis symptoms, and little on structure, the World Health Organization recommends that effective management of obesity include early prevention of weight gain to avoid a missed opportunity to improve osteoarthritis outcomes. As per Radojicic et al.⁴⁶ weight control may not only reduce the chances for spreading of the osteoarthritis condition from a single joint to multiple joints, and a more rapid onset of joint dysfunction and derangement, it may also reduce the degree of ensuing musculoskeletal pain that can contribute to further body weight gains and is a process that can take place in youth from the earliest point in time as discussed by Bastida et al.⁴⁷ By contrast, as per Cantell et al.⁴⁸ a failure to acknowledge obesity osteoarthritis linkages will predictably result in a high degree of preventable suffering including a higher rather than lower inflammatory state, pain, and functional disabilities.⁴⁹ Empathy as well as non-judgmental communications are needed here however, especially in the event the client may already have tried to lose weight and failed or feels victimized and that their condition is being unfairly exploited or exaggerated in some way.⁵⁰

Discussion

This current discourse was initiated to examine if the premise of a universal acceptance approach to all obese or overweight youth and adults appears to avert harm, or whether a more neutral stance or nuanced approach that does not neglect any possible health risks of this philosophy is indicated, for example in the case of the second most disabling disease in the world, termed osteoarthritis.⁵¹

While it is clear, most Western societies have glamorized ‘thinness’ and have looked unfavorably on ‘fatness’, evidence since at least 2000 has shown global increments not only in childhood overweight, but in adult obesity rates as well. At the same time, even if the research is biased in some way, many studies reveal the early onset of diseases previously known only to impact older adults, such as diabetes type 2 have a strong obesity association, regardless of the role of multiple inequities, lifestyles and human behaviors.⁵¹ As such it is hard to refute that excess body fat is likely a strong predisposing as well as pathogenic factor for many chronic health conditions,⁵² including osteoarthritis.

At the same time, allusions to the importance for some to accept one’s weight status, regardless, is an idea that has gained some recent leverage, for example, where weight loss recommendations are seen in terms of patient bullying. Moreover, arguments are made currently in 2023 that disparage the notion that obesity and its medical categorization is an identifiable treatable health factor. Furthermore, even if the mode of assessing overweight can be contested in many cases, the failure to carefully examine joint health in the midst of obvious overweight is risky and potentially harmful. At the same time, some emergent social media influencers and others continue to help to glorify large body sizes, even if in some cases health and life quality may be severely jeopardized in the long term by framing all such medical recommendations as injurious.

Moreover, even if evidence over time will be found to support such claims, if we consider children who cannot adequately approach this idea rationally and who are highly impressionable, as well as at high risk for multiple negative health consequences, adults who do not apprehend or attend accordingly to this oftentimes irreversible health negating risk, cannot expect this issue to disappear readily. At the same time even if genetic factors predominate, it appears that the unfettered use of social media that promote unhealthy healthy practices and messages alone needs to be duly curtailed, even if only from an energy balance point of view. Alternately, if this is a compelling situation what can be done by policy makers, as well as caretakers/givers to minimize harm that may be of immense societal significance for years to come? Should more scrutiny be forthcoming as to the pervasive nature of some health beliefs that may not be evidence based and thus misinform, along with health behaviors that may be socially constructed or engineered for profit of some sort but unhealthy for many? Similarly, is there moral justification for dissuading a child from dieting and physical activity due to distrust, or because the caregiver or teacher is obese and feels healthy and accepting of any apparent ‘fat’ state as a human variation or a sociological inequality issue, rather than one linked to ill health, and possible highly costly, yet preventable sociological, societal, debilitating, and suboptimal life quality outcomes.

To avert obesity linked harm in any form, it appears researchers in both camps and others can help by continuing to test their theories and to thereby offer more evidence based data that can help to solidify and codify the facts on this topic. To support their contentions, the use of agreed upon measurement approaches that can more ably justify and explain their views as well as variations and misconceptions that pertain to a ‘one size fits all’ perspective are especially indicated. If ‘fat acceptance’ is more efficacious in advancing health in an adult with osteoarthritis and excess body weight than individualized comprehensive treatment approaches, this needs to be better and more specifically documented.⁵² If on the other hand, preventing obesity from the earliest point in time will actually eliminate the need for most to argue in favor of ‘fat acceptance’ at any size or age this should be specifically examined and communicated. Alternately, more evidence validating the belief that the presence of excess body fat is not a health

impediment at any age should be forthcoming in the event excess fat is actually a positive health state or one less likely to be injurious than is commonly espoused or argued by some [<https://www.cnet.com/health/medical/the-obesity-paradox-how-fat-can-be-good-for-you/#>].

In the interim, regardless of whether fat in excess is healthy or unhealthy, or a genetically determined biological, rather than a behavioral problem, providers should be mindful of the need to avoid negative weight frames as well as possible errors in classifying weight status, but also of how policy and environment shapes the citizens' health options, and ideas. Accepting that one universal message, solution or conceptual set of understandings for all is likely in this regard will probably be challenging to achieve in light of the many additional cultural factors alone that influence body size as well as its personal meaning differentially. Attention to the pervasive multiple social and media determinants that appear to foster behaviors that are thought to raise the risk for excess weight gain at all ages and that appear skewed towards a high number of economically marginalized citizens and their families wherever they reside appears highly important to address by all who can influence social policies, regardless of ideology.

Moreover, even if this present report is limited and has not included all lines of inquiry, and though much future research is warranted according to many researchers in this field to clarify the facts and to eliminate erroneous 'fat status' misconceptions of any sort, it appears plausible in our view to propose:

Children should be guided towards health at all sizes from the earliest point in time and accepted respectfully regardless of body size to avoid any unintended adverse outcomes including fat stigma impacts and should be supported empathetically and accordingly.

Social determinants of obesity must be exposed and targeted and eliminated and clinicians should not fall under the spell of magic bullets and surgical solutions while failing to provide dignified and life affirming personalized counseling and intervention opportunities and ensuring food security among other factors for all.⁵³

The importance of a health equity and weight inclusive approach in this realm must be duly acknowledged to avert the immense human costs of failing to do this.⁵⁴ At the same time, pervasive influences of youth directed media influencers and their oftentimes slanted messages, along with marketers and those attaining economic rewards from distributing unhealthy food and drug sales and others must be acknowledged and addressed.⁵⁴ Glamorizing as well as shaming obese young and older adults must surely be avoided and shunned at all costs. The dangers of social media groups and web blogs that afford perceived social protection and comfort to those who feel weight stigmatized may need to be examined closely.

More attention to the ethics of studying the trajectory of obesity across time to examine what might manifest or not to young obese children and others in the future appears to warrant close examination to avoid the same possible sentiments that led to the infamous Tuskegee debacle and the study and follow up of the disenfranchised rather than the franchised even though a solution to the health issue was fairly well established.

Evidence highlighting the need to intervene as early as possible to foster life-long wellness and that nutrition and physical activity promotion is vital for all and key beneficial findings in this regard should be strongly marketed among those sites most viewed by children and youth, as well as among multiple 'fat acceptance' based social media sites as is currently being enacted in a fair number of cases.^{55,56} Physicians, community members, sociologists, educators,

parents, caregivers, ethicists, businesses, and psychologists need to become more involved independently and collectively in strategies to advocate and enact health equity issues, including physical and mental health equity and removing societal barriers to healthy options as well as harmful health messages. All forms of body size misinformation and discrimination across the lifespan must be eliminated and averted no matter where they surface.

Concluding remarks

In line with the aforementioned discussion, and in recognition of the limitations of both the research evidence and the challenges in capturing all points of view, obvious gaps in what is published, and their possible biases, methodological shortcomings, measurement controversies, and dogma, it is concluded that the idea that there is no definitive causative obesity-disease linkage, and hence its elimination or treatment can be contested must remain open to question.

However, even if not well studied or supported by mainstream medical literature, and emerging social forces, this current analysis and effort to examine the question of whether excess body 'fat' is synonymous with ill health or is socially constructed variable designed to perpetuate myths must accept possible osteoarthritis-obesity linkages that cannot be ignored due to the following facts.

1. Ample evidence points to a moderate to high impact of being obese in fostering a dose related higher than desirable risk of painful disabling osteoarthritis in early and late adulthood, and especially early adulthood where no other health risk is observed.
2. Excess body weight is not beneficial physiologically to the status of an osteoarthritic joint and may inadvertently induce metabolic diseases that affect joint physiology adversely in their own right.
3. Weight normalization, while not curative, tends to prove more beneficial than a failure to do so in cases with defined osteoarthritis deemed to be obese.
4. Even if 'fatness' as a body state is deemed acceptable so as to prevent sociological biases that can impact wellbeing in multiple ways, an overweight person in excess pain who cannot move freely is likely to be jeopardized most severely at multiple levels including social biases.
5. All factors considered, their possible dependence on opioids and drugs alone by a severely obese osteoarthritis sufferer may render their lives highly challenging rather than not, and heighten their mortality risk, even if surgery to replace the severely damaged joint[s] is forthcoming.
6. In addition, accepting the excess body fat is merely a body size issue rather than a health issue may lead to an increase in both the global obesity 'epidemic' as well as disabling osteoarthritis and multiple adverse health and economic issues.
7. Until more evidence in support of a state of fatness prevails, careful surveillance of social media sites and others used by youth might help ensure youth are not inadvertently led to pursue unhealthy behaviors, nor encouraged to accept features of their being that may reduce their lifespan and its quality and opportunities for success, self-esteem, and joy by influencers that have powerful agendas and followings, despite their limited evidence base.
8. At the same time, parents and caregivers, as well as lawmakers and clinicians who appear to be informed yet neglect the importance of fostering a child's optimal body weight from the earliest point in time must be seen as being counter-productive in multiple ways, even if all facts governing this issue are not flawless.

To ensure optimal musculoskeletal health across the lifespan, the negative impact of excess fat at any age should not go unheeded even if other chronic diseases are found unaffected and all concerned guardians and health providers and educators must overlook their divergent views and be open to creating a more just and health affirming society for all.

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Conflicts of interest

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